

ELEVATOR-HALL-DOOR OPENING-HOLDING FIXTURE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority to and incorporates by reference the entire contents of Japanese Patent Application No. 2013-116302 filed in Japan on May 31, 2013.

FIELD

Embodiments described herein relate to an elevator-hall-door opening-holding fixture.

BACKGROUND

Conventionally, an elevator moves an elevator car to an arbitrary floor by moving the elevator car within a shaft. For such an elevator, an elevator-hall-door opening-holding fixture is often used during installation work or maintenance/inspection work.

In the conventional technique, there is still room for improvement in workability, for example.

SUMMARY

An elevator-hall-door opening-holding fixture comprises: a backbone unit that is formed into a plate shape; a first protrusion that protrudes from one surface

of the backbone unit; and a second protrusion that protrudes from the other surface of the backbone unit, wherein at least one of the first protrusion and the second protrusion can be pressed and fitted into a sill groove of an elevator hall door, wherein each of the first protrusion and the second protrusion is formed into a plate shape, and a surface direction of the first protrusion is orthogonal to a surface direction of the second protrusion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an example of a schematic configuration of a fixture according to a first embodiment;

FIG. 2 is a partial perspective view of a state of providing the fixture according to the first embodiment in a sill groove;

FIG. 3 is a partial perspective view of a state where the fixture according to the first embodiment holds an elevator hall door;

FIG. 4 is a perspective view of an example of a schematic configuration of a fixture according to a second embodiment;

FIG. 5 is a perspective view of an example of a schematic configuration of a fixture according to a third embodiment;

FIG. 6 is a perspective view of an example of a schematic configuration of a fixture according to a fourth embodiment; and

FIG. 7 is a perspective view of an example of a schematic configuration of a fixture according to a fifth embodiment.

DETAILED DESCRIPTION

First embodiment

FIG. 1 is a perspective view of an example of a schematic configuration of a fixture according to a first embodiment. FIG. 2 is a partial perspective view of a state of providing the fixture according to the first embodiment in a sill groove. FIG. 3 is a partial perspective view of a state where the fixture according to the first embodiment holds an elevator hall door.

A fixture 1 shown in FIGS. 1, 2, and 3 as an elevator-hall-door opening-holding fixture according to the present embodiment is a fixture used when a worker opens an elevator hall door 50 and goes in and out of a shaft or the like during, for example, elevator installation work or elevator maintenance/inspection work. The fixture 1 is provided in a sill groove 51 of the elevator hall door 50 and temporarily fixes and holds the elevator hall door 50 in a state where the elevator hall door 50 is open.

In the example of the present embodiment, as shown in FIG. 3, the sill groove 51 is formed in a hall sill 52 provided on a lower side of the elevator hall door 50 in

the vertical direction to extend along an opening/closing direction of the elevator hall door 50. The elevator hall door 50 is opened or closed along the hall sill 52 with a low end portion of the elevator hall door 50 in the vertical direction guided by this sill groove 51.

As shown in FIG. 1, the fixture 1 according to the present embodiment includes a backbone unit 2, a first protrusion 3, and a second protrusion 4. The fixture 1 is formed of an elastic body such as rubber or resin with the backbone unit 2, the first protrusion 3, and the second protrusion 4 formed integrally with one another.

The backbone unit 2 is formed into a plate shape. The backbone unit 2 according to the present embodiment is formed into a circular plate shape. The backbone unit 2 functions as a stopper unit that restricts a movement of the elevator hall door 50 in a state where the fixture 1 is provided in the sill groove 51 (see FIG. 3). The first protrusion 3 and the second protrusion 4 are formed on protrusion formation surfaces 2a and 2b of the backbone unit 2 that face each other in parallel, respectively. The backbone unit 2 also functions as a transmission unit that transmits a force for pressing either the first protrusion 3 or the second protrusion 4 into the sill groove 51 at the time of pressing and fitting either the first protrusion 3 or the second protrusion 4 into the sill groove 51. Either

the protrusion formation surface 2a or 2b of the backbone unit 2 serves as an upper surface of the backbone unit 2 in the vertical direction and the other serves as a lower surface thereof in the vertical direction in the state where the fixture 1 is provided in the sill groove 51 (see FIGS. 2 and 3).

The first protrusion 3 protrudes from one protrusion formation surface 2a of the backbone unit 2. The second protrusion 4 protrudes from the other protrusion formation surface 2b of the backbone unit 2. Each of the first protrusion 3 and the second protrusion 4 according to the present embodiment is formed into a rectangular plate shape. At least one of the first protrusion 3 and the second protrusion 4 can be pressed and fitted into the sill groove 51 of the elevator hall door 50. The first protrusion 3 and the second protrusion 4 according to the present embodiment are both formed to have such dimensions that each of the first protrusion 3 and the second protrusion 4 can be pressed and fitted into the sill groove 51. Each of the first protrusion 3 and the second protrusion 4 functions as a held portion held by the sill groove 51 in a state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51 (see FIGS. 2 and 3).

In the example of the present embodiment, the first protrusion 3 and the second protrusion 4 are formed so that protrusion sizes H1 and H2 in a protrusion direction are nearly equal to each other, width sizes W1 and W2 in a width direction are nearly equal to each other, and thickness sizes T1 and T2 in a thickness direction are nearly equal to each other. Furthermore, the first protrusion 3 and the second protrusion 4 that are formed in the plate shapes are formed so that surface directions of the first protrusion 3 and the second protrusion 4 are parallel to each other. That is, the first protrusion 3 and the second protrusion 4 are formed to satisfy a dimensional relation and a positional relation in which the first protrusion 3 and the second protrusion 4 are substantially plane symmetrical with respect to the backbone unit 2.

The protrusion direction is a direction in which the first protrusion 3 or the second protrusion 4 protrudes from the protrusion formation surface 2a or 2b of the backbone unit 2, respectively, for each of the first protrusion 3 and the second protrusion 4, and typically a direction orthogonal to the protrusion formation surface 2a or 2b. The width direction is a direction orthogonal to the protrusion direction for each of the first protrusion 3 and the second protrusion 4, and typically a direction

along an extension direction of the sill groove 51 in the state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51 (see FIGS. 2 and 3). The thickness direction is a direction orthogonal to the protrusion direction and the width direction for each of the first protrusion 3 and the second protrusion 4, and typically a direction orthogonal to the extension direction of the sill groove 51 in the state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51 (see FIGS. 2 and 3). In the example of the present embodiment, because the first protrusion 3 and the second protrusion 4 are formed to be plane symmetrical with respect to the backbone unit 2, all the protrusion direction, the width direction, and the thickness direction of the first protrusion 3 match those of the second protrusion 4, respectively.

Furthermore, each of the first protrusion 3 and the second protrusion 4 is formed to extend from one edge of the protrusion formation surface 2a or 2b to the other edge thereof in the width direction. The first protrusion 3 and the second protrusion 4 are formed so that the protrusion sizes H1 and H2 are shorter than a depth size D (see FIG. 2) of the sill groove 51. Facing surfaces 3a or 4a of the first protrusion 3 or the second protrusion 4 facing each other in the thickness direction serve as contact surfaces

that contact groove side surfaces 51a of the sill groove 51, respectively, in the state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51 (see FIGS. 2 and 3). A configuration in which the surface direction of the first protrusion 3 is parallel to that of the second protrusion 4 as described above typically corresponds to a configuration in which the facing surfaces 3a of the first protrusion 3 are parallel to the facing surfaces 4a of the second protrusion 4.

The fixture 1 configured as described above is mounted into the sill groove 51 after the worker opens the elevator hall door 50 during, for example, the elevator installation work or the elevator maintenance/inspection work. For example, the worker pinches either the first protrusion 3 or the second protrusion 4 of the fixture 1 between fingers to grasp either the first protrusion 3 or the second protrusion 4, and presses and fits the other one of the first protrusion 3 and the second protrusion 4 into the sill groove 51. In the example of FIG. 2, the first protrusion 3 of the fixture 1 is grasped by the worker, and the second protrusion 4 is inserted and pushed into the sill groove 51 in a positional relation in which the width direction of the second protrusion 4 is along the extension direction of the sill groove 51. In this way, the second

protrusion 4 of the fixture 1 is pressed and fitted into the sill groove 51.

At this time, the worker pushes the second protrusion 4 into the sill groove 51 while holding the fingers against the backbone unit 2 of the fixture 1 (see arrows shown in FIG. 2), so that a pressing force for pressing the second protrusion 4 into the sill groove 51 can be efficiently transmitted to the second protrusion 4. That is, the backbone unit 2 of the fixture 1 functions as the transmission unit and the fixture 1 can directly transmit the pressing force to the second protrusion 4 via this backbone unit 2.

Furthermore, the fixture 1 is formed so that the protrusion sizes H1 and H2 of the first protrusion 3 and the second protrusion 4 are shorter than the depth size D of the sill groove 51. Accordingly, the fixture 1 enables the second protrusion 4 to be pressed and fitted into the sill groove 51 and pushed into the sill groove 51 up to a position at which the lower surface of the backbone unit 2 or, in the example of the present embodiment, the protrusion formation surface 2b contacts the hall sill 52.

As shown in FIG. 3, the fixture 1 functions as the stopper unit by causing an end surface or the like of the backbone unit 2 to abut on a lower end portion of an end surface 50a of the elevator hall door 50 in the state where

the second protrusion 4 is pressed and fitted into the sill groove 51. The fixture 1 can thereby restrict the movement of the elevator hall door 50 along the sill groove 51. At this time, the fixture 1 functions as a holding unit due to frictional forces generated between the facing surfaces (the contact surfaces) 4a of the second protrusion 4 pressed and fitted into the sill groove 51 and the groove side surfaces 51a of the sill groove 51, respectively, and the second protrusion 4 is held in the state of being pressed and fitted into the sill groove 51. As a result, the fixture 1 can temporarily fix and hold the elevator hall door 50 in the state where the elevator hall door 50 is open. Furthermore, the fixture 1 can sufficiently secure a contact area between the backbone unit 2 and the hall sill 52 because the lower surface of the backbone unit 2 or, in the example of the present embodiment, the protrusion formation surface 2b firmly contacts the hall sill 52 in the state where the second protrusion 4 is pressed and fitted into the sill groove 51 as described above. As a result, it is possible to further ensure that the fixture 1 can temporarily fix and hold the elevator hall door 50 in the state where the elevator hall door 50 is open because the fixture 1 can be configured to prevent the second protrusion 4 from easily detaching from the sill groove 51.

While it has been described above that the first protrusion 3 of the fixture 1 is grasped by the worker and that the second protrusion 4 is pressed and fitted into the sill groove 51, the first protrusion 3 and the second protrusion 4 can be used oppositely. That is, the second protrusion 4 of the fixture 1 can be grasped by the worker and the first protrusion 3 can be pressed and fitted into the sill groove 51.

The worker can detach the fixture 1 from the sill groove 51 by, for example, pinching either the first protrusion 3 or the second protrusion 4 of the fixture 1 or, in the example of FIG. 3, the first protrusion 3 between the fingers to grasp either the first protrusion 3 or the second protrusion 4 and pulling the second protrusion 4 out from the sill groove 51 after completion of predetermined work within the shaft or the like. The fixture 1 can thereby return the elevator hall door 50 to a state where the elevator hall door 50 can be opened or closed again.

Therefore, it is possible to improve workability because the fixture 1 according to the present embodiment can temporarily fix and hold the elevator hall door 50 in the state where the elevator hall door 50 is open by the easy work as described above. For example, it is possible to improve the workability because the fixture 1 is configured as a single component in which the elements are

formed integrally and the fixture 1 can hold the elevator hall door 50 in the door open state by pressing and fitting the first protrusion 3 or the second protrusion 4 into the sill groove 51. Furthermore, because the fixture 1 can prevent, for example, work of fastening screws or the like when used, it is also possible to improve the workability in this respect.

Furthermore, the fixture 1 is break-proof because the fixture 1 is configured by the single component as compared with, for example, a case where a fixture is configured by many articles. The fixture 1 can also prevent a situation in which the fixture 1 becomes unusable because of defect, missing, or the like of one of the constituent articles. Because regions of the fixture 1 to which aged deteriorations possibly occur are mainly the first protrusion 3 and the second protrusion 4, it is possible to clearly set basis of replacement and safety can be eventually improved.

Further, even if the fixture 1 is dropped within the shaft, it is possible to suppress breaking of an apparatus, damage of a client design object, or the like because the fixture 1 is configured by an elastic body. It is possible to improve the workability also in this respect. Because the fixture 1 is configured by an elastic body, it is possible to suppress damage of the client design object or

the like even if the fixture 1 contacts the client design object or the like at the time of carrying the fixture 1.

Furthermore, because the fixture 1 can efficiently transmit the pressing force to the second protrusion 4 via the backbone unit 2 at the time at which the worker presses and fits the second protrusion 4 into the sill groove 51, a loss in the force can be reduced during insertion. Also in this respect, the workability can be improved.

While it has been described above that each of the first protrusion 3 and the second protrusion 4 can be pressed and fitted into the sill groove 51, it suffices that at least one of the first protrusion 3 and the second protrusion 4 is formed into such a shape and such dimensions as to be able to be pressed and fitted into the sill groove 51.

The fixture 1 described above includes the backbone unit 2, the first protrusion 3, and the second protrusion 4. The backbone unit 2 is formed into a plate shape. The first protrusion 3 protrudes from one protrusion formation surface 2a of the backbone unit 2. The second protrusion 4 protrudes from the other protrusion formation surface 2b of the backbone unit 2. At least one of the first protrusion 3 and the second protrusion 4 can be pressed and fitted into the sill groove 51 of the elevator hall door 50. Therefore, the fixture 1 can realize an improvement in the

workability because the fixture 1 can temporarily fix the elevator hall door 50 in the state where the elevator hall door 50 is open by the simple work.

Second embodiment

FIG. 4 is a perspective view of an example of a schematic configuration of a fixture according to a second embodiment. An elevator-hall-door opening-holding fixture according to the second embodiment differs from that according to the first embodiment in a dimensional relation between the first and second protrusions. Redundant explanations of configurations, operations, and effects common to those in the embodiment mentioned above will be omitted as much as possible (the same holds true for other embodiments explained below).

A fixture 201 shown in FIG. 4 as the elevator-hall-door opening-holding fixture according to the present embodiment includes the backbone unit 2, the first protrusion 3, and the second protrusion 4. The first protrusion 3 and the second protrusion 4 according to the present embodiment differ in the thickness from each other. That is, the fixture 201 according to the present embodiment is configured so that the thickness size T1 of the first protrusion 3 differs from the thickness size T2 of the second protrusion 4.

In the example of the present embodiment, the first protrusion 3 and the second protrusion 4 are formed so that the thickness size T2 of the second protrusion 4 is larger than the thickness size T1 of the first protrusion 3 while the protrusion sizes H1 and H2 (see FIG. 1) are nearly equal to each other and the width sizes W1 and W2 (see FIG. 1) are nearly equal to each other. In the example of the present embodiment, the first protrusion 3 is formed to have the protrusion size H1, the width size W1, and the thickness size T1 to be able to be pressed and fitted into a first sill groove 51. On the other hand, the second protrusion 4 is formed to have the protrusion size H2, the width size W2, and the thickness size T2 to be able to be pressed and fitted into a second sill groove 51 wider than the first sill groove 51.

The fixture 201 described above can temporarily fix the elevator hall door 50 by the easy work in the state where the elevator hall door 50 is open by being mounted into the sill groove 51 of the elevator hall door 50. Therefore, it is possible to improve the workability. Furthermore, according to the fixture 201 described above, the first protrusion 3 and the second protrusion 4 are formed into plate shapes and differ in the thickness from each other. Therefore, it is possible to improve versatility and further improve the workability because the

first protrusion 3 and the second protrusion 4 of the fixture 201 can be pressed, fitted, and mounted into the two types of sill grooves 51 having different dimensions, respectively.

Third embodiment

FIG. 5 is a perspective view of an example of a schematic configuration of a fixture according to a third embodiment. An elevator-hall-door opening-holding fixture according to the third embodiment differs from that according to the first or second embodiment in a positional relation between the first and second protrusions.

A fixture 301 shown in FIG. 5 as the elevator-hall-door opening-holding fixture according to the present embodiment includes the backbone unit 2, the first protrusion 3, and the second protrusion 4. The first protrusion 3 and the second protrusion 4 according to the present embodiment are formed so that the surface direction of the first protrusion 3 is orthogonal to that of the second protrusion 4.

In the example of the present embodiment, the first protrusion 3 and the second protrusion 4 are formed so that the protrusion sizes H1 and H2 in protrusion directions (see FIG. 1) are nearly equal to each other, the width sizes W1 and W2 in width directions (see FIG. 1) are nearly equal to each other, and that the thickness sizes T1 and T2

in thickness directions (see FIG. 1) are nearly equal to each other. The first protrusion 3 and the second protrusion 4 each formed into a plate shape are formed to satisfy a positional relation in which the surface direction of the first protrusion 3 is orthogonal to that of the second protrusion 4. That is, the facing surfaces 3a of the first protrusion 3 and the facing surfaces 4a of the second protrusion 4 cross-hatched in FIG. 5 are orthogonal to each other (cross each other by 90°). In the example of the present embodiment, as described above, the facing surfaces 3a or 4a of the first protrusion 3 or the second protrusion 4 are the surfaces that possibly serve as the contact surfaces that contact the groove side surfaces 51a of the sill groove 51.

Therefore, in the fixture 301 according to the present embodiment, the protrusion direction of the first protrusion 3 matches that of the second protrusion 4 whereas the width direction of the first protrusion 3 is orthogonal to that of the second protrusion 4 and the thickness direction of the first protrusion 3 is orthogonal to that of the second protrusion 4. In the fixture 301 in the example of the present embodiment, the width direction of the first protrusion 3 is parallel to the thickness direction of the second protrusion 4 and the width

direction of the second protrusion 4 is parallel to the thickness direction of the first protrusion 3.

The fixture 301 described above can temporarily fix the elevator hall door 50 by the easy work in the state where the elevator hall door 50 is open by being mounted into the sill groove 51 of the elevator hall door 50. Therefore, it is possible to improve the workability. Furthermore, according to the fixture 301 described above, the first protrusion 3 and the second protrusion 4 are formed into plate shapes and the surface directions of the first protrusion 3 and the second protrusion 4 are orthogonal to each other. Therefore, it is possible to improve strength of the fixture 301 itself because the first protrusion 3 is orthogonal to the second protrusion 4. In addition, the fixture 301 can be structured to facilitate transmitting a force to the first protrusion 3 or the second protrusion 4 via the backbone unit 2 at the time of pressing and fitting the first protrusion 3 or the second protrusion 4. That is, the fixture 301 can be configured to further facilitate transmitting the force downward in the vertical direction because the first protrusion 3 is orthogonal to the second protrusion 4. As a result, the fixture 301 can further improve the workability. The fixture 301 described above can be

configured so that the first protrusion 3 differs from the second protrusion 4 in the thickness.

Fourth embodiment

FIG. 6 is a perspective view of an example of a schematic configuration of a fixture according to a fourth embodiment. An elevator-hall-door opening-holding fixture according to the fourth embodiment differs from that according to the first, second, or third embodiment in shapes of the first and second protrusions.

A fixture 401 shown in FIG. 6 as the elevator-hall-door opening-holding fixture according to the present embodiment includes the backbone unit 2, the first protrusion 3, and the second protrusion 4. Each of the first protrusion 3 and the second protrusion 4 according to the present embodiment is formed into a tapered shape from a side of the backbone unit 2 to a side of an end.

In the example of the present embodiment, the first protrusion 3 and the second protrusion 4 are formed so that the protrusion direction H1 and the width direction W1 of the first protrusion 3 are nearly equal to the protrusion direction H2 and the width direction W2 of the second protrusion 4, respectively (see FIG. 1), and that shapes of the first protrusion 3 and the second protrusion 4 in the thickness direction are the tapered shapes. In the first protrusion 3, at least one of the facing surfaces 3a cross-

hatched in FIG. 6 or, in the example of the present embodiment, both of the facing surfaces 3a have an inclination so that the thickness size of the first protrusion 3 becomes gradually smaller from the side of the backbone unit 2 to the side opposite to the backbone unit 2 (the side of the end). Similarly, in the second protrusion 4, at least one of the facing surfaces 4a cross-hatched in FIG. 6 or, in the example of the present embodiment, both of the facing surfaces 4a have an inclination so that the thickness size of the second protrusion 4 becomes gradually smaller from the side of the backbone unit 2 to the side opposite to the backbone unit 2 (the side of the end). In the example of the present embodiment, as described above, the facing surfaces 3a or 4a of the first protrusion 3 or the second protrusion 4 are the surfaces that possibly serve as the contact surfaces that contact the groove side surfaces 51a of the sill groove 51. That is, each of the first protrusion 3 and the second protrusion 4 according to the present embodiment is formed to have an inclined surface on the facing surfaces 3a or 4a so that a thickness size TB of an end portion of the end side is smaller than a thickness size TA of an end portion on the side of the backbone unit 2, and formed so that a cross-sectional shape along the thickness direction is substantially a trapezoidal shape.

The fixture 401 described above can temporarily fix the elevator hall door 50 by the easy work in the state where the elevator hall door 50 is open by being mounted into the sill groove 51 of the elevator hall door 50. Therefore, it is possible to improve the workability. Furthermore, according to the fixture 401 described above, each of the first protrusion 3 and the second protrusion 4 is formed into a tapered shape from the side of the backbone unit 2 to the side of the end. Therefore, the fixture 401 ensures that the first protrusion 3 or the second protrusion 4 can be pressed and fitted into the sill groove 51 even if, for example, the sill groove 51 is worn. As a result, the workability can be further improved because it is possible to ensure that the fixture 401 can temporarily fix the elevator hall door 50. The fixture 401 described above can be configured so that the first protrusion 3 differs from the second protrusion 4 in the thickness.

Fifth embodiment

FIG. 7 is a perspective view of an example of a schematic configuration of a fixture according to a fifth embodiment. An elevator-hall-door opening-holding fixture according to the fifth embodiment differs from those of the first, second, third, and fourth embodiments in that the

elevator-hall-door opening-holding fixture includes a through hole.

A fixture 501 shown in FIG. 7 as the elevator-hall-door opening-holding fixture according to the present embodiment includes the backbone unit 2, the first protrusion 3, and the second protrusion 4. The fixture 501 according to the present embodiment further includes a through hole 505.

The through hole 505 penetrates the backbone unit 2, the first protrusion 3, and the second protrusion 4 along the protrusion direction. The through hole 505 has openings on end surfaces of both the first protrusion 3 and the second protrusion 4, respectively, and penetrates the backbone unit 2, the first protrusion 3, and the second protrusion 4. While the through hole 505 according to the present embodiment is formed into a cylindrically hollow shape, the through hole 505 is not limited to this shape and can be formed into, for example, a rectangular cylinder hollow shape.

The fixture 501 described above can temporarily fix the elevator hall door 50 by the easy work in the state where the elevator hall door 50 is open by being mounted into the sill groove 51 of the elevator hall door 50. Therefore, it is possible to improve the workability. Furthermore, the fixture 501 described above includes the

through hole 505 that penetrates the backbone unit 2, the first protrusion 3, and the second protrusion 4, and the first protrusion 3 and the second protrusion 4 are, similarly to the other embodiments, formed of an elastic body. Therefore, because the fixture 501 includes the through hole 505, the first protrusion 3 or the second protrusion 4 is elastically deformed and flattened in the thickness direction as indicated by arrows shown in FIG. 7 at the time of pressing and fitting the first protrusion 3 or the second protrusion 4 into the sill groove 51. It is thereby possible to smoothly press and fit the first protrusion 3 or the second protrusion 4 into the sill groove 51. As a result, the fixture 501 can realize a further improvement in the workability. Furthermore, the through hole 505 of the fixture 501 that is flattened at the time of pressing and fitting tends to return in directions opposite to the directions of the arrows indicated in FIG. 7 in the state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51. Accordingly, in the state where the first protrusion 3 or the second protrusion 4 is pressed and fitted into the sill groove 51, the fixture 501 can attach the facing surfaces (the contact surfaces) 3a or the facing surfaces (the contact surfaces) 4a of the first protrusion 3 or the second protrusion 4 to the corresponding groove

side surfaces 51a of the sill groove 51 more firmly. As a result, the fixture 501 can obtain a higher holding force because the frictional forces generated between the facing surfaces 3a or the facing surfaces 4a of the first protrusion 3 or the second protrusion 4 and the groove side surfaces 51a of the sill groove 51 can be relatively increased. Further, use of the through hole 505 of the fixture 501 as an attachment hole for a strap or the like enables an improvement in carrying performance. The fixture 501 described above can be configured so that the first protrusion 3 differs from the second protrusion 4 in the thickness. Furthermore, diameters of the through hole 505 of the fixture 501 can be changed depending on a thickness of the first protrusion 3 and that of the second protrusion 4, respectively. That is, the diameter of the through hole 505 in a portion provided in the first protrusion 3 and that in a portion provided in the second protrusion 4 can be different from each other depending on the thickness of the first protrusion 3 and that of the second protrusion 4, respectively.

The elevator-hall-door opening-holding fixtures according to the embodiments mentioned above are not limited to the embodiments and various modifications can be performed within the scope described in claims for patent. The elevator-hall-door opening-holding fixture according to

the present embodiment can be configured by appropriately combining the constituent elements of the embodiments and modification examples explained above.

For example, the fixture can be configured so that the first protrusion 3 and the second protrusion 4 are formed into plate shapes, the thickness of the first protrusion 3 differs from that of the second protrusion 4, the surface direction of the first protrusion 3 is orthogonal to that of the second protrusion 4, each of the first protrusion 3 and the second protrusion 4 is formed into tapered shapes from the side of the backbone unit 2 to the side of the end, and that the fixture includes the through hole 505.

With the elevator-hall-door opening-holding fixtures according to the embodiments and the modification examples explained above, the workability can be improved.

Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

CLAIMS

1. An elevator-hall-door opening-holding fixture comprising:
 - a backbone unit that is formed into a plate shape;
 - a first protrusion that protrudes from one surface of the backbone unit; and
 - a second protrusion that protrudes from the other surface of the backbone unit, wherein
 - at least one of the first protrusion and the second protrusion can be pressed and fitted into a sill groove of an elevator hall door, wherein
 - each of the first protrusion and the second protrusion is formed into a plate shape, and
 - a surface direction of the first protrusion is orthogonal to a surface direction of the second protrusion.
2. The elevator-hall-door opening-holding fixture according to claim 1, wherein a thickness of the first protrusion differs from a thickness of the second protrusion.
3. The elevator-hall-door opening-holding fixture according to any one of claims 1 and 2, wherein each of the first protrusion and the second protrusion is formed into a tapered shape from a side near the backbone unit to a side of an end.

4. The elevator-hall-door opening-holding fixture according to any one of claims 1 to 3, further comprising a through hole that penetrates the backbone unit, the first protrusion, and the second protrusion, wherein

each of the first protrusion and the second protrusion is formed of an elastic body.

ELEVATOR-HALL-DOOR OPENING-HOLDING FIXTURE

ABSTRACT

An elevator-hall-door opening-holding fixture according to an embodiment includes a backbone unit, a first protrusion, and a second protrusion. The backbone unit is formed into a plate shape. The first protrusion protrudes from one of surfaces of the backbone unit. The second protrusion protrudes from the other surface of the backbone unit. At least one of the first protrusion and the second protrusion can be pressed and fitted into a sill groove of an elevator hall door.

Figure 1